



**New Jersey Department of Health  
Vaccine Preventable Disease Program**

**MUMPS LABORATORY TESTING FAQs**

**SPECIMEN COLLECTION AND MANAGEMENT**

**1. Who should be tested for suspected mumps infection?**

Any person with clinical features compatible with mumps should be tested. Clinical diagnosis of mumps may be unreliable, so suspected cases of mumps should be laboratory confirmed. As with any disease, lab work should be used in conjunction with clinical presentation (signs and symptoms).

**2. What specimens should be collected from patients meeting the clinical case definition?**

The Centers for Disease Control and Prevention (CDC) recommends that a buccal/oral swab and blood specimen be collected from all patients with clinical features compatible with mumps. Urine is not as desirable but is where the virus sheds last, so it can be collected later in the course of illness.

**3. What is the gold standard for laboratory confirmation of mumps?**

Viral culture is the gold standard. For a clinically compatible case of suspected mumps, the most desirable test is a buccal or oral swab, collected within 3 days of parotitis onset, for reverse transcriptase polymerase chain reaction (RT-PCR) testing or culture.

**4. When is the best time to collect clinical specimens?**

Specimens should be collected from patients with clinical features compatible with mumps as soon as possible after onset of symptoms.

- Buccal specimens have the best chance of containing virus when collected within 3 days of onset of parotitis.
- Urine is the last place the mumps virus sheds and should be collected no sooner than 4 days after the onset of parotitis and no later than day 12.
- Blood should also be collected as soon as possible after onset of parotitis.

*Note: please refer to Laboratory Results section for additional information on how vaccination status and timing of collection can affect results.*

### **5. How long would you be able to detect mumps in specimens?**

This depends on the type of specimen and vaccination status of the person. It is recommended that specimens be collected as close to parotitis onset as possible (but preferably within 3 days).

- Swabs may be positive in unvaccinated persons up to 9 days post onset, however among suspected cases that have received 1 or more doses of a mumps-containing vaccine, virus may be cleared much earlier.
- IgM can be positive for up to 1 month in unvaccinated persons. However vaccinated persons, regardless of timing of collection, may not have detectable IgM.

### **6. Should any specimens be collected from a suspected case that is outside the recommended time period for a swab?**

Yes. While you may have missed the opportunity to collect a swab, you can still collect urine, as the window for urine collection is longer (up to day 12) than that of swabs. In addition, serum can be collected as IgM can remain elevated for up to 1 month in unvaccinated persons. You can also collect serum specimens 2-3 weeks apart to measure acute and convalescent IgG titers, although this might not be helpful in vaccinated persons.

### **7. How should specimens be collected and managed?**

Buccal/Oral Swab: Swabs should be synthetic (non-cotton). Brands of synthetic swabs include Dacron® and Copan. This is the same type of swab and media used for influenza PCR testing. Massage the parotid gland area (the space between the cheek and teeth just below the ear) for about 30 seconds prior to collection of the buccal secretions. The parotid duct (Stensen's duct) drains in this space near the upper rear molars. Place swabs in 2-3 ml of standard, commercially available viral transport medium (VTM). If VTM is not available, use sterile isotonic solution (e.g. phosphate buffered saline) in a sterile urine collection container or a blood collection tube that contains no gels or other agents. Keep specimens cold (4°C) and ship using ice packs.

Serologic testing: Collect 7-10 ml of blood in a red top or serum separator tube (red-speckled or gold). Keep specimens cold (4°C) and ship using ice packs.

Urine: Collect a minimum volume of 50 ml of urine in a sterile container. Keep specimens cold (4°C) and ship using ice packs.

### **LINKS:**

“Illustration of parotid gland and instructions for collection of buccal fluid”

<http://www.cdc.gov/mumps/lab/detection-mumps.html>

“Materials and Methods of Specimen Collection, Storage, and Shipment”

<http://www.cdc.gov/mumps/lab/specimen-collect.html>

### **8. Where can specimens be sent for testing?**

Each specimen must be clearly labelled with the patient's name, date of birth, and date of collection. Mumps testing can be performed by commercial laboratories. Commercial laboratories have different testing capabilities based on specimen type; carefully check both the specimen type and the specific test to be requested.

Specimens also may be submitted to the NJDOH Public Health and Environmental Laboratory (PHEL) for testing at CDC:

- Approval for submission to PHEL can be coordinated through the LHD. Once submission is approved, the LHD can assist with coordination of transport to PHEL.
- Any specimen submitted to PHEL must be accompanied by a NJDOH SRD-1 form (<http://web.doh.state.nj.us/apps2/forms/> - write “Attention: Virology for forwarding to CDC” on the form). Incorrectly labeled specimens submitted to PHEL will be rejected and discarded.

#### **9. What is the turnaround time for lab results?**

Many factors can affect turnaround time. These factors include a) differing turnaround times for tests at laboratories; b) differing test methodologies used; c) timing of specimen collection and transportation of specimens to laboratories. For example, some labs have a 3-5 day PCR turnaround and a turnaround of approximately 2 weeks for culture. Turnaround from CDC also depends on collection timing and transportation, but generally takes around 2 weeks.

*Note: results from CDC are not intended to guide the patient's clinical management, but are for public health surveillance purposes.*

## **LABORATORY RESULTS**

#### **10. A specimen tests negative for mumps virus by RT-PCR or culture. Do these results rule out mumps infection?**

No. These specimens could be negative because the amount of virus shed at the time of specimen collection was very low. Other factors can also significantly reduce the likelihood of detecting mumps virus such as inadequate specimen collection, processing, shipping or storage. An example of this is symptomatic persons who have received 1 or more doses of mumps-containing vaccine, as they may clear the virus more rapidly.

#### **11. How do I interpret serology results?**

Note: Serologic tests should be interpreted with caution, as false-positive and false-negative results are possible with IgM tests.

##### Unvaccinated Persons

- A positive IgM test result indicates current/very recent infection or reinfection. As with any lab test, there can be false-positive test results (refer to question 13).
- If an acute IgM is collected within 3 days of parotitis onset and the IgM is negative, a second serum specimen (collected 5-7 days after onset) is recommended as a delayed IgM response has been reported.
- IgG: IgG alone is not diagnostic unless you obtain both an acute (can be done as soon after onset as the patient is seen, but ideally 4-5 days after onset of symptoms) and convalescent (from 2-3 weeks after onset) blood specimen for serologic tests to determine if a four-fold rise in IgG antibody titer has occurred (e.g., from 1:40 to 1:320). Although acute and convalescent titers might be useful for clinicians, this test will not help classify cases for public health purposes.

### Vaccinated Persons

- Mumps should not be ruled out in someone with negative IgM who is vaccinated if they have symptoms consistent with mumps.
- A detailed investigation should be conducted for each case with emphasis on accurate and complete immunization history. Recent outbreaks have included many cases who had already received at least one dose of mumps-containing vaccine.
- In vaccinated persons, the existing IgG will begin to rise soon after exposure and infection. At the time of onset of symptoms and collection of the acute serum, the IgG may already be quite elevated, which would obviate the 4-fold rise in titer expected when comparing acute and convalescent specimens.

### **12. If the IgM result is negative and IgG is positive, can mumps be ruled out?**

Absence of a mumps IgM response in a vaccinated or previously infected individual presenting with clinically compatible mumps *does not rule out mumps* as a diagnosis. A positive IgG result is expected among previously vaccinated persons. Older persons or foreign nationals with no history of mumps illness or vaccination may have detectable mumps IgG due to a previous subclinical infection.

### **13. Are there any etiologic agents that can interfere with serologic assays for mumps (i.e., produce false-positive results)?**

Parainfluenza viruses 1, 2, and 3, Epstein-Barr virus, adenovirus, and human herpesvirus 6 have all been noted to interfere with mumps serologic assays.

### **14. Is it possible to demonstrate a 4-fold rise in titer between paired serum specimens (acute and convalescent) among cases of mumps with a history of 1 or 2 doses of mumps-containing vaccine?**

It may not be possible. In vaccinated persons, the existing IgG will begin to rise soon after exposure and infection. At the time of onset of symptoms and collection of the acute serum, the IgG may already be quite elevated, and obviate the 4-fold rise observed in convalescent serum specimen. Although acute and convalescent titers might be useful for clinicians, this test will not help classify cases for public health purposes.

## **FOR MORE INFORMATION**

### **Where can I get more information on mumps?**

- Your local health department
  - Directory of Local Health Departments in New Jersey, available at: <http://www.state.nj.us/health/lh/directory/lhdselectcounty.shtml>
- NJ DOH Vaccine Preventable Disease Program, 609-826-5964, <http://www.state.nj.us/health/cd/mumps/>
- Centers for Disease Control & Prevention [www.cdc.gov/](http://www.cdc.gov/)

For additional information and materials on proper handwashing techniques, please visit the NJDOH Communicable Disease Service's Link: <http://nj.gov/health/cd/handwashing.shtml>

This information is intended for educational purposes only and is not intended to replace consultation with a health care professional.